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FEDERAL COBOL COMPILER TESTING SERVICE WASHINGTON D C  
FORTRAN COMPILER VALIDATION SUMMARY REPORT, (U)  
1977

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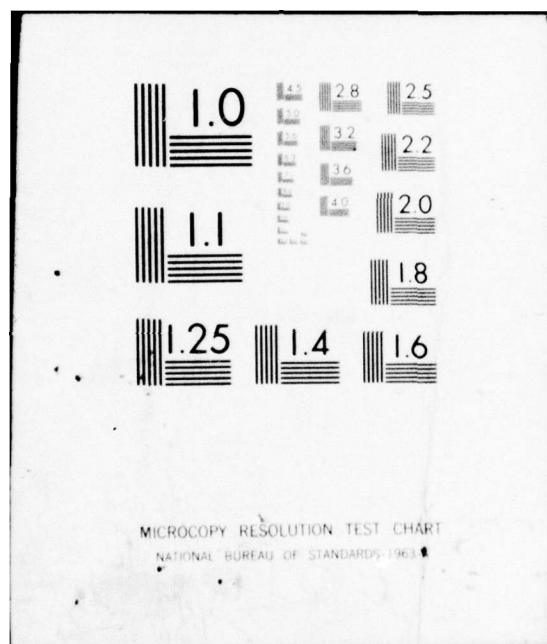
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BIBLIOGRAPHIC DATA SHEET		1. Report No. FCVS66-VSR215	2.	3. Recipient's Accession No.
4. Title and Subtitle Validation Summary Report # FCVS66-VSR215 IBM 360/370 OS FORTRAN "CODE & GO" 3.0			5. Report Date	
7. Author(s) Same as organization - see 9.			8. Performing Organization Rept. No.	
9. Performing Organization Name and Address Federal COBOL Compiler Testing Service ADP Selection Office Department of the Navy Washington, D. C. 20376			10. Project/Task/Work Unit No.	
12. Sponsoring Organization Name and Address Automatic Data Processing Selection Office Department of the Navy Washington, D. C. 20376			11. Contract/Grant No.	
15. Supplementary Notes 11 1997			13. Type of Report & Period Covered	
16. Abstracts This Validation Summary Report (VSR) for the IBM 360/370 'CODE & GO' FORTRAN Compiler Version 3.0 ( OS Version 21.8 ) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1966 FORTRAN Standard (X3.9-1966). The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies; a section relating the categories of discrepancies to the language; and a detailed listing of discrepancies together with the tests which were failed.			14.	
17. Key Words and Document Analysis. 17a. Descriptors				
Programming Languages Standards Compilers FORTRAN Verifying Proving Program Correctness Software Engineering:			SAMPLE Underlined information must be provided for each VSR released to NTIS.	
17b. Identifiers/Open-Ended Terms FCVS CVS				
17c. COSATI Field/Group 09/02				
18. Availability Statement Release unlimited			19. Security Class (This Report) UNCLASSIFIED	
20. Security Class (This Page) UNCLASSIFIED			21. No. of Pages	
22. Price				

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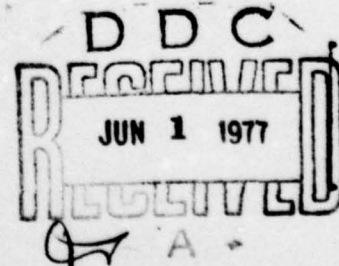
**FORTRAN COMPILER  
VALIDATION SUMMARY REPORT**

VALIDATION NUMBER FCVS66-VSR215 ✓

Prepared By: ✓

FEDERAL COBOL COMPILER TESTING SERVICE  
DEPARTMENT OF THE NAVY  
WASHINGTON, D.C. 20376

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FCVS66-VSR215

**FORTRAN COMPILER VALIDATION**  
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1. Validation Number	FCVS66-VSR215
2. Vendor	International Business Machines
3. Mainframe	IBM System 360/65
4. Compiler Identification	FORTRAN CODE and 60 Release 3.0
5. Operating System Identification	OS 21.8 MVT with HASP 3.1
6. Compiler Validation System Version Number	FCVS66 1.2

\*PLEASE NOTE. The Department of the Navy may make full and free public disclosure of the Validation Summary Report (VSR) in accordance with the "Freedom of Information Act" (5 U.S.C. #552). The results of this validation are only for the purpose of satisfying United States Government requirements, and apply only to the Computer System, Operating System release, and compiler version identified in the VSR. The FORTRAN Compiler Validation System is used to determine, insofar as is practical, the degree to which the subject compiler conforms to American Standard FORTRAN, X3.9-1966. Thus, the VSR is necessarily discretionary and judgmental. The United States Government does not represent or warrant that the statements, or any one of them, set forth in the VSR are accurate or complete. The VSR is not meant to be used for the purpose of publicizing the findings summarized therein.

For information concerning this compiler you can contact the vendor's designated representative named below:

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Bethesda, Maryland 20034

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10. ABSTRACT  
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## SECTION 1. INTRODUCTION

### 1.1 Purpose of the Validation Summary Report

The purpose of the Validation Summary Report (VSR) is to identify individual FORTRAN language elements whose implementation does not conform to the language specifications defined in American Standard FORTRAN, X3.9-1966.

### 1.2 Preparation of the VSR

The Validation Summary Report is prepared by analyzing the results of running the FORTRAN Compiler Validation System (FCVS). The FORTRAN Compiler Validation System consists of audit routines containing features of American Standard FORTRAN, their related data, and an Executive Routine which prepares the audit routines for compilation. Each audit routine is a FORTRAN program which includes many tests and supporting procedures indicating the result of the tests.

The testing of a compiler in a particular hardware/operating system environment is accomplished by compiling and executing each audit routine. The report produced by each routine tells whether the compiler passed or failed the tests in the routine. If the compiler rejects some language elements by terminating compilation, giving fatal diagnostic messages, or terminating execution abnormally, then the test containing the code the compiler was unable to process is deleted. The audit routine is compiled again and execution is repeated.

The compilation listings and the output reports of the audit routines constitute the raw data from which the members of the Federal COBOL Compiler Testing Service produce a Validation Summary Report.

### 1.3 Organization of the VSR

The Validation Summary Report is made up of several sections whose contents are described below.

a. Section 2 summarizes the results of the compilation and execution of the programs comprising the FORTRAN Compiler Validation System. Section 2 is divided into a subsection describing the syntax errors encountered while compiling the FORTRAN audit routines, and a subsection describing the semantic errors which occurred during execution of the FORTRAN audit routines.

b. Section 3 contains information which describes the software environment in which the compiler was tested. This includes the name and version of the operating system and the logical unit/physical device assignments used in the programs comprising the FCVS. The options used with the compiler are also given, and if applicable, the use of compiler optimization features is explained.

c. Appendix A is the Validation Summary Working Document, a working paper resulting from the compilation and execution of the FCVS. The body



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of the VSR is derived from Appendix A.

#### 1.4. Use of the VSR

The Department of the Navy may make full and free public disclosure of the Validation Summary Report (VSR) in accordance with the "Freedom of Information Act" (5 U.S.C. #552). The results of the validation are only for the purposes of satisfying United States Government requirements, and apply only to the computer system, operating system release, and compiler version identified in the VSR.

The FORTRAN Compiler Validation System is used to determine, insofar as is practical, the degree to which the subject compiler conforms to the FORTRAN Standard. Thus, the VSR is necessarily discretionary and judgmental. The United States Government does not represent or warrant that the statements, or any one of them, set forth in the VSR are accurate or complete. The VSR is not meant to be used for the purpose of publicizing the findings summarized therein.

#### 1.5 Sources of Additional Information

The detailed FORTRAN language specifications are given in the publication "American Standard FORTRAN, X3.9-1966", available from the American National Standards Institute, 1430 Broadway, New York, New York 10018.

An explanation of the FORTRAN Compiler Validation System is contained in the FCVS User's Guide. This document explains how to run the compiler validation system. The User's Guide and a magnetic tape containing a copy of the FCVS programs are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia, 22151. (Ordering information can be obtained from the Federal COBOL Compiler Testing Service.)

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## SECTION 2. DETAILED EVALUATION OF ERRORS.

This section summarizes the results of the compilation and execution of the programs comprising the FORTRAN Compiler Validation System (FCVS). The version of the FCVS used during this validation is shown inside the front cover of the VSR.

Section 2 is made up of two subsections. The first subsection describes each syntax error encountered during compilation of the audit routines, and the second subsection describes the semantic errors encountered during execution of the audit routines.

Each error or deviation noted in this section makes reference to an audit routine named in Appendix A (Validation Summary Working Document). This reference provides the documented results of an occurrence of errors/deviations detected during the running of the FCVS using the compiler within the environment identified in this document. The Validation Summary Working Document is presented in sequence by audit routine name.



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**2.1 Syntactical Errors**

**No syntactical errors occurred during the compilation of the FCVS audit routines.**

**2.2 Semantic Errors**

**No semantic errors occurred during the execution of the FCVS audit routines.**

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### SECTION 3. SOFTWARE ENVIRONMENT.

The compiler referenced in this document was validated using the software environment described in this section. When using a modification of the described environment, the compiler may or may not continue to conform to the Standard. It should be noted that during the validation process, an attempt is made to validate as many different options as possible.

The use of compiler options, logical unit/physical device assignments, and any form of optimization which is not described in this report could cause the compiler to produce a program that does not perform according to the specifications of Standard FORTRAN. Only the environment described in this document has been used with this compiler to satisfy the validation requirements of the Department of the Navy.

#### 1. Options or parameters used on the processor call statement for the compiler.

##### Options specified:

##### a. Batch - Without Optimization.

The processor call statement which was used is

```
//STEP EXEC FCDGOCL
```

The options which were used by the compiler are NODECK, SOURCE, EBCDIC, SHORT, FIXED, 60 and LINECNT=55.

##### b. Batch - With Optimization.

There was no optimization feature for this compiler.

##### c. Time-sharing - Without Optimization.

The processor call command which was used is

```
GOFORT FM--- FIXED
```

The options which were used by the compiler are the same as a. above.

##### d. Time-sharing - With Optimization.

There was no optimization feature for this compiler.

#### 2. Logical Unit/Physical Device Assignments.

##### Printer Destined Files:

Logical unit 06 was assigned to the system print device. For batch processing this was the printer and for time-sharing processing this was the time-sharing terminal.



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**Tape Files:**

Logical unit 07 was assigned to a tape file by using the following command

```
//FT07F001 DD DSN=TO1,UNIT=2400,DISP=(,KEEP),DCB=(BLKSIZE=110,RECFM=U)
```

**Sequential Mass-storage Files:**

Logical unit 07 was assigned to a mass-storage file by using the following command

```
//FT07001 DD UNIT=3330,SPACE=(CYL,(2,1)),DCB=(BLKSIZE=110,RECFM=U)
```

**Card Input Files:**

Logical unit 05 was assigned to the systems input device. For batch processing this was the card reader and for time-sharing processing this was the time-sharing terminal.

3. Optimization. The compiler may or may not have optimization features. If there was an optimization feature available, it was used during the validation process (during a separate execution of the Compiler Validation System) to determine if its use causes the compiler to produce a program which does not give the expected results. If the optimization is invoked through the compiler call statement then it is mentioned in paragraph 1 above. If it is invoked through the introduction of a compiler directing source program statement, it is shown below. Optimization which would require modification to source program statements is not considered in this report in that it is beyond the scope of the use of Standard FORTRAN and the validation process.

There is no optimization feature for this compiler.

**4. Compiler.**

FORTRAN CODE and GO

**5. Operating system.**

OS version 21.8, MVT with NASP 3.1

**6. Computer System Reference Manual.**

IBM System/360 OS(TSO) CODE and GO FORTRAN Processor Terminal User's Guide, Publication SC28-6842-1, June 1971.

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#### APPENDIX A

##### VALIDATION SUMMARY WORKING DOCUMENT

This appendix is a working paper produced during the validation and documents the results of the compilation and execution of each of the programs comprising the FCVS. The results contained herein are based on the use of the compiler within the Validation Environment identified in this appendix. This appendix (Validation Summary Working Document) is not part of the official Validation Summary Report (VSR), and it is not intended to reflect in any way the compiler's usefulness or degree of conformance to the language specifications.

The reader of this appendix should keep in mind that the same problem area may appear in more than one program but is considered only as a single discrepancy, and the problem is reflected only once in the body of the VSR. (The VSR will in turn only reference the first occurrence of the problem in the appendix.)

This appendix is divided into four parts. The first part describes the Validation Environment. The second part lists the Monitor Input Cards used in creating a job control stream for execution in the batch mode. The third part shows the control cards required to compile and execute an individual program. The fourth part of the document is divided into two categories of information: compilation results and execution results. Information items, such as compiler warning messages, are included in the summary of compilation and execution results.

The reference document for FORTRAN is American Standard FORTRAN, X3.9-1966.

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VALIDATION ENVIRONMENT

COMPILER IDENTIFICATION:	FORTRAN CODE and 60
COMPUTER SYSTEM:	IBM SYSTEM 360/65
OPERATING SYSTEM:	OS 21.8 MVT with HASP 3.1

Each of the programs comprising the FCVS was compiled and executed in the batch mode. In addition, the programs which test I/O, FM100 through FM108, were first run with the output logical unit assigned to a tape device, and then rerun with the output logical unit assigned to a mass-storage device.

The FORTRAN compiler for this system was also validated by compiling and executing selected FCVS audit routines under IBM's Time-Sharing Option (TSO). The output logical unit for the test results was the terminal device, and the output logical units for the I/O tests were assigned to mass-storage devices. There was no difference in results when the audit routines were compiled and executed under TSO.



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#### CCVS EXECUTIVE ROUTINE CONTROL CARDS

The CCVS Executive Routine was used to prepare the FCVS programs for execution in the batch mode. The Control Cards used as input to the CCVS Executive together with the job control language for executing the Executive Routine are listed below:

```
//VALDATE3 JOB (190602,4A00),'MIKE O CUNNINGHAM',CLASS=6,REGION=150K
// EXEC VALDATEH
//STEP1.SYSIN DD *
*DATE 033177
*INITIAL ALL
B-0103J//XXXXX JOB (190602,4A00),'FORTRANCODE60',CLASS=6
B-02 S//STEPX EXEC PGM=IEBGENER
B-03 S//SYSPRINT DD SYSOUT=A
B-04 S//SYSUT1 DD *,DCB=(LRECL=80,BLKSIZE=80,RECFM=F)
B-0519S INCLUDE SYSLMOD(XXXXX)
B-06 //SYSUT2 DD DSN=VALIDATE.CONTROL,DISP=OLD
B-07 T//SYSUT2 DD DSN=VALIDATE.CONTROL,DISP=MOD
B-08 S//SYSIN DD DUMMY
B-0907S//STEP9 EXEC FCDGOCL
B-10 S//FORT.SYSIN DD *
B-11
E-0137S//LKED.SYSLMOD DD DSN=VALIDATE.LOAD(XXXXX),
E-02 S// DISP=SHR
E-03 J//LINK EXEC PGM=IEWL,REGION=150K,
E-04 J// PARM='XREF,LIST,LET,NCAL'
E-05 J//SYSPRINT DD SYSOUT=A
E-06 J//SYSUT1 DD UNIT=SYSWRK,SPACE=(CYL,(10,5))
E-0733J//SYSLMOD DD DSN=VALIDATE.LOAD(XXXXX),DISP=SHR
E-08 J//SYSLIN DD DSN=VALIDATE.CONTROL,DISP=SHR
E-0921J//STEPLAST EXEC PGM=XXXXX,REGION=100K
E-10 J//STEPLIB DD DSN=VALIDATE.LOAD,DISP=SHR
E-11 JBREAK***
E-13 J//FT06F001 DD SYSOUT=A
E-14 J//FT05F001 DD *
E-15 JDATE***
E-16 J/*
E-17
E-12 J//FT07F001 DD UNIT=3330,SPACE=(CYL,2,1),DCB=(BLKSIZE=110,RECFM=U)
E-12 J//FT07F001 DD UNIT=2400,DSN=T07,DISP=(,KEEP),DCB=(BLKSIZE=110,RECFM=U)
```

(Selection cards for FCVS audit routines)

```
*BCD-POP YES
*CCVSR 74
*LIST UPDATES,XCARDS,CTL,JCL
*PRGID
*END-MONITOR
*BEGIN-UPDATE
*END-UPDATE
/*
```



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```
/*  
//STEP2 EXEC SCHEDULE  
//STEP2.BQUE DD UNIT=(3330,3),SPACE=(CYL,(30,2))  
//BJCL DD DSN=VALIDATE.READERH,DISP=OLD,VOL=SER=LWKLIB,UNIT=3330,  
// DCB=(LRECL=80,BLKSIZE=400,RECFM=FB)  
/*
```

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# CONTROL CARDS FOR RUNNING FCVS PROGRAMS

The job control stream for compiling and executing an individual audit routine consisted of the following job control language:

```
//FM109 JOB (190602,4A00),'FORTRAN CODE60',CLASS=G
//STEPX EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD *,DCB=(LRECL=80,BLKSIZE=80,RECFM=F)
  INCLUDE SYSLMOD(FM109)
//SYSUT2 DD DSN=VALIDATE.CONTROL,DISP=OLD
//SYSIN DD DUMMY
//STEP015 EXEC FCD60CL
//FORT.SYSIN DD *
```

(audit routine source program)

```
//LKED.SYSLMOD DD DSN=VALIDATE.LOAD(FM109),
// DISP=SHR
//LINK EXEC PGM=IEWL,REGION=150K,
//  PARM='XREF,LIST,LET,NCAL'
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD UNIT=SYSWRK,SPACE=(CYL,(10,5))
//SYSLMOD DD DSN=VALIDATE.LOAD(FM109),DISP=SHR
//SYSLIN DD DSN=VALIDATE.CONTROL,DISP=SHR
//STEPLAST EXEC PGM=FM109,REGION=100K
//STEPLIB DD DSN=VALIDATE.LOAD,DISP=SHR
//FT07F001 DD UNIT=3330,SPACE=(CYL,(2,1)),DCB=(LRECL=110,RECFM=U)
//FT06F001 DD SYSOUT=A
//FT05F001 DD *
/*
```

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RUN SUMMARIES

FM001 through FM035

A. Compilation

No errors.

B. Execution

No errors.

FM036

A. Compilation

The message

IGK487I 0000338 ILLEGAL STMT

was issued by the compiler on a blank source line.

B. Execution

No errors.

FM037

A. Compilation

No errors.

B. Execution

No errors.

FM038

A. Compilation

The messages

IGK420I 0000054 NO STMT NMBR

IGK487 0000054 ILLEGAL STMT

were issued by the compiler on a blank source line.

B. Execution



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No errors.

FM039 through FM045, FM050 through FM062, FM080 through FM083, and  
FM097 through FM099

A. Compilation

No errors.

B. Execution

No errors.

FORTAN I/O Routine FM100 through FM108

In the batch mode, the I/O routines were executed with the output logical unit assigned to a tape device and rerun with the output logical unit assigned to a mass-storage device. For the time-sharing runs, the I/O routines were executed with the output logical unit assigned to a mass-storage device.

FM101 through FM108

A. Compilation

No errors.

B. Execution

No errors.

FM109

A. Compilation

No errors.

B. Execution

No errors.